

This text is presented by DTV workshop, the first half of text is used for seminar.

The migration pass and the experiences to the digital terrestrial broadcasting

DTV Workshop 2004

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Actual schedule of implementing Digital Terrestrial Television Broadcasting in Japan



- DTV Workshop 2004*
- Dec 1.st 2003** **Start of DTTB !**
(Tokyo, Nagoya, Osaka)
 - Apr. 2003** Provisional licenses were awarded
 - Feb.2003** Start of Analog channel reallocation
 - Sep. 2002** MPHT established license conditions and requirements
 - 1999-2003** Real Scale Experiment Broadcasting
 - 1999** MPT established technical standard
 - 1998** Issue of Digital Broadcasting Study Group Report
 - 1994** MPT asked to Council for technical requirement

Schedule of DTTB

- 2003 Three major cities
- 2006 Other cities
- 2011 SW' over of Analog

Frequency repacking after the analog SW' over

- ▶ Just started study for frequency planning of low power translators

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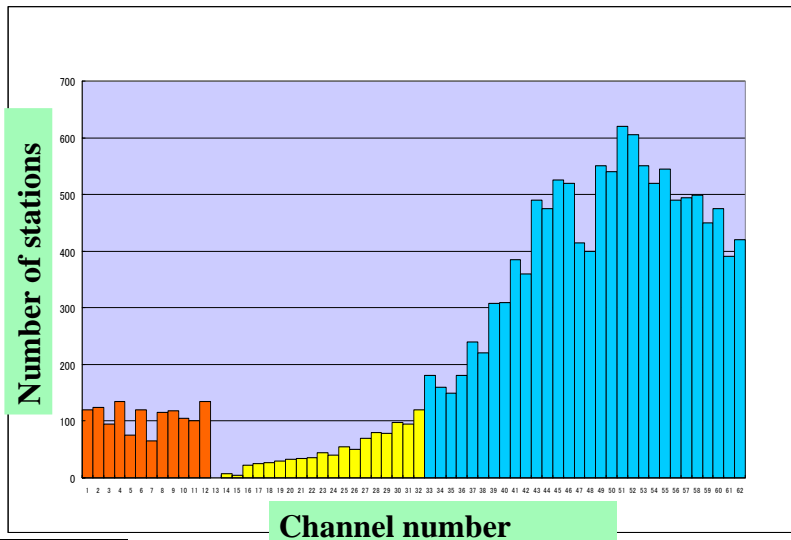
Impossible frequency allocation for DTTB ?

15,000 stations in Japan
including translator stations



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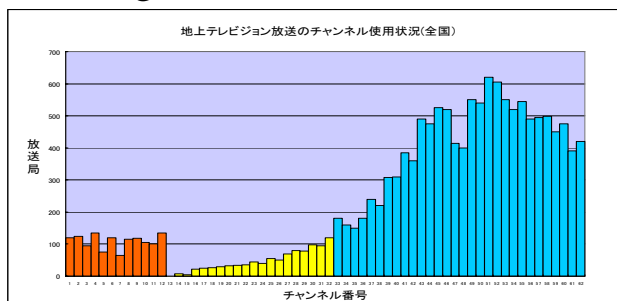
Frequency allocation of conventional terrestrial television



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The condition of frequency planning

- Digital ch-plan. 13ch to 52(54)ch
(Withdrawal from UHF 53 (55) ch~62ch TV band)
- Basically allocate UHF Low band for digital broadcasting



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Frequency Planning

- Working group in 32 districts
- Three places local meetings for the solution of interferences problem between each district



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Frequency Planning

- About 6 years to complete final result
- More than 500 persons totally have participated in the frequency planning work

“Ariake meeting”, most frequency congested area in Japan

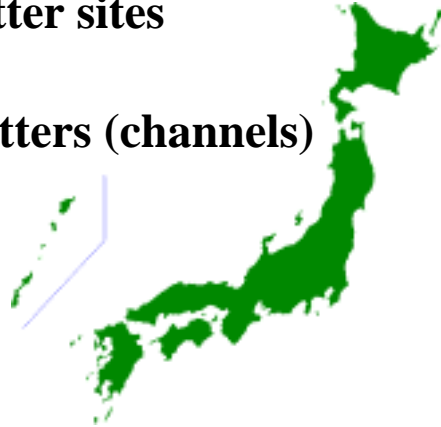


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Digital channel allocation

➤ **553** transmitter sites

➤ **3,172** transmitters (channels)



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Planning parameters (Major protection ratios)

Desired	Undesired	channel	Protection ratio
Analog	Digital	Co-channel	45dB
		L-adjacent	0dB
		U-adjacent	10dB
Digital	Analog	Co-channel	30dB
		L-adjacent	-21dB
		U-adjacent	-24dB
	Digital	Co-channel	28dB
		L-adjacent	-26dB
		U-adjacent	-29dB

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Reallocation of Analog TV frequency

- TV-receiver tuning to another channel at 4.26million homes
- Require roof top antenna replacement in the limited area (ex.: from L-band to All-band)

Replace transmitters and transmitting antennas of translator stations

Financial support of ¥180billion by the government

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Reallocation of Analog TV frequency

Current progress Oct.31th.' 04

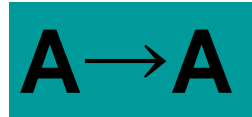
Receiver tuning and roof top antenna replacement in the limited area

Completed 40% of 4.26million homes

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Introduction of new technology to avoid interferences

- Development of “Off set beat canceling technology ”
- H&V dual polarization spot emission
- Synchronous operation of translator
- Emission using “canceling antenna”
 - Co-channel 45dB
 - Off-set 32dB
 - Precision off-set 28dB



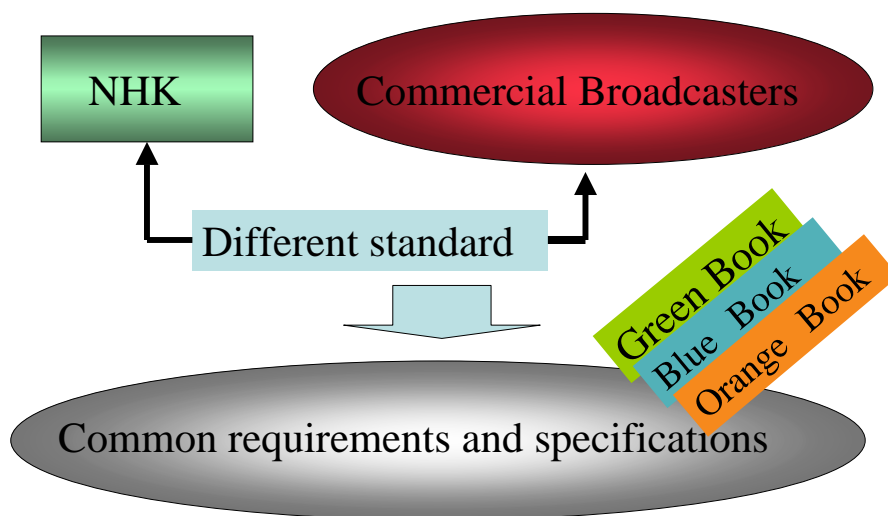
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Issues to take into consideration during simulcast

- Interference by the booster amplifier inter-modulation due to the over input power by receiving digital signal
- Interference to the community antenna system which have the same local channel allocation

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Cost reduction of Transmitter and Antenna



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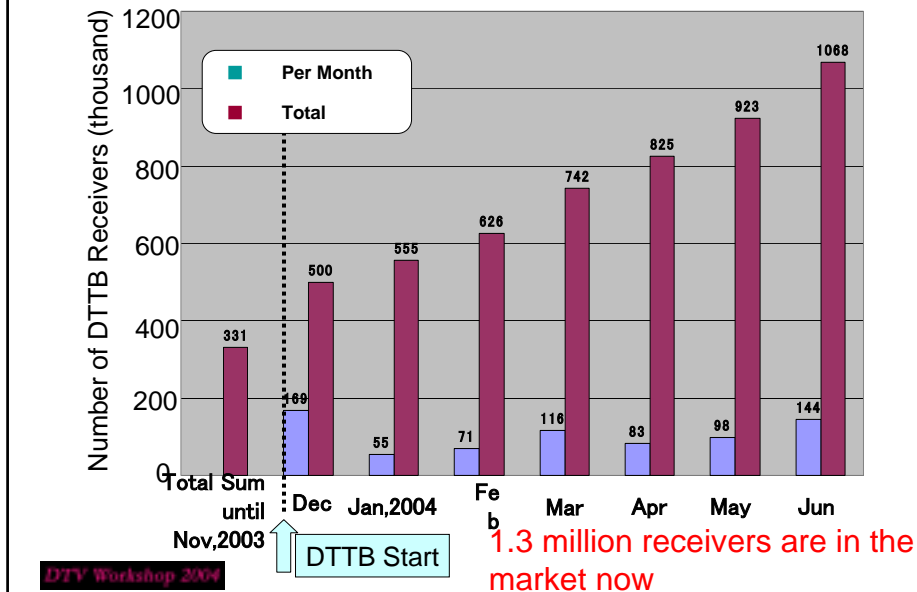
Successful publication of so called “Green book”

- Agreement with 127 commercial broadcasters and NHK
- cooperation with manufacturers
- Joint construction of transmitting equipments and transmitting antennas in the same service area

Green Book
Blue Book
Orange Book

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Rapid increase of DTTB Receiver Shipment



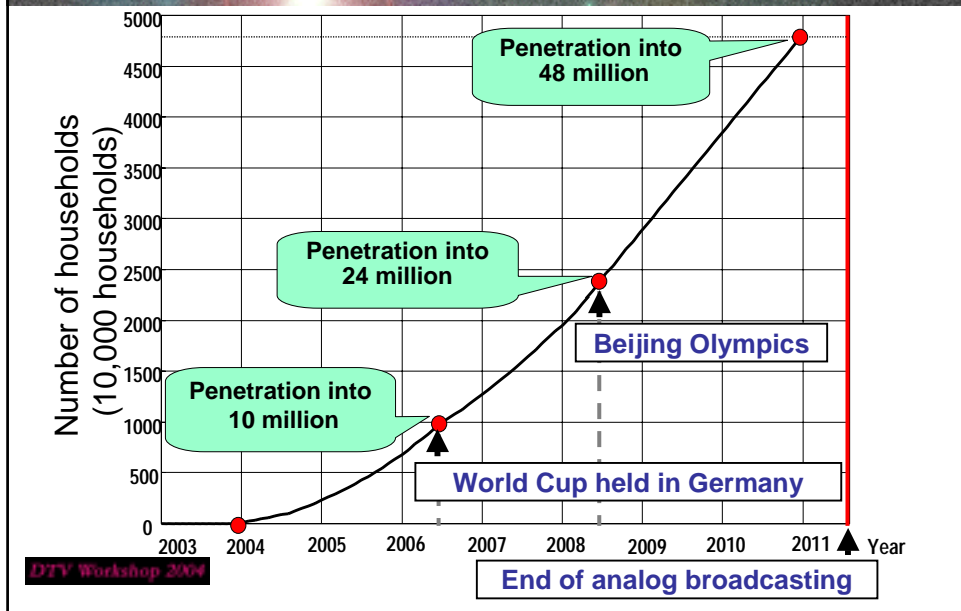
Action Plan to Promote DTTB

Decision of the "DTTB promotion conference (Oct 31th 2003)

composed by government, broadcasters and industries

- Set objectives for the penetration of DTTB receivers including cable reception
- Set objectives for expansion in the coverage rate of digital broadcasting in the three main areas (Tokyo, Osaka, Nagoya)
- Action items for government, broadcasters, manufactures, retailers

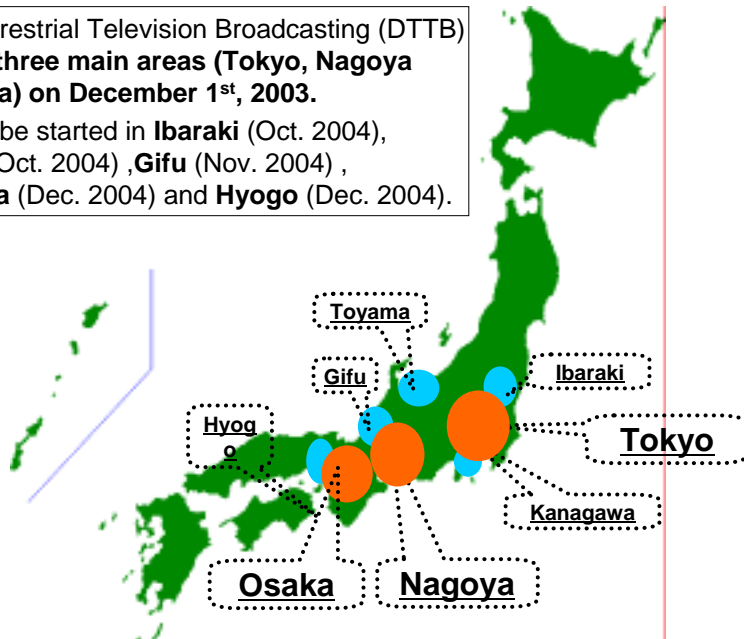
Objectives for the penetration of terrestrial digital broadcasting receivers (households)



Service area of DTTB in Japan

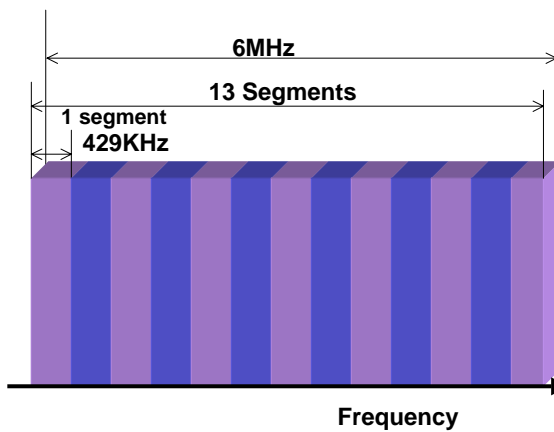
Digital Terrestrial Television Broadcasting (DTTB) started in **three main areas (Tokyo, Nagoya and Osaka)** on **December 1st, 2003**.

DTTB will be started in **Ibaraki** (Oct. 2004), **Toyama** (Oct. 2004), **Gifu** (Nov. 2004), **Kanagawa** (Dec. 2004) and **Hyogo** (Dec. 2004).



ISDB-T system

Band Segmented OFDM : Orthogonal Frequency Division Multiplexing



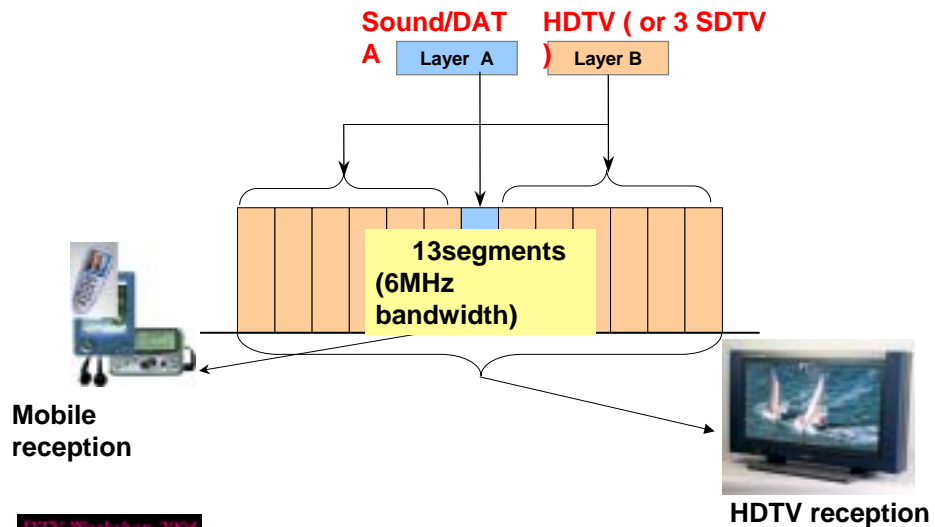
Features

- Modulation: DQPSK, QPSK, 16QAM, 64QAM
- 1HDTV or 3SDTV/channel
- Net data rate: 23.42Mbps (6MHz)
- Single Frequency Network
- Mobile reception (time interleaving)

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Segmented Structure and Partial Reception

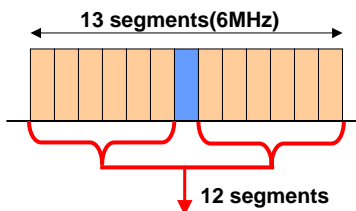
Example of Hierarchical Multiplexing



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HDTV service

Example : modulation 64QAM
 code ratio 3/4
 guard interval 1/8
 bit rate 16.9 Mbps

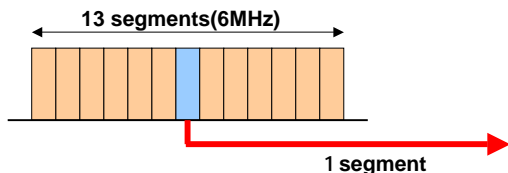


	SDTV	HDTV
aspect ratio	4:3	16:9
scanning line	525	1125

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Broadcasting to Portable Terminals

Example : modulation 16QAM
 code ratio 1/2
 guard interval 1/4
 bit rate 630 kbps



Display image

Visual data

Text data



Prototype Mobile Phone receiver

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Example for mobile phone receiver



- Feature**
- DTTB receiver
 - GPS chip
 - Browser

Developed by 

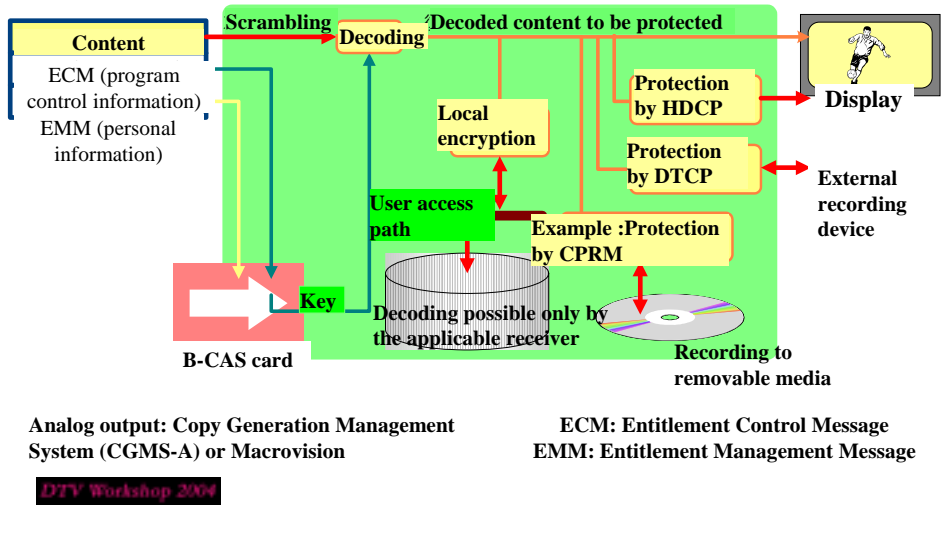
Hardware Specification	
WEIGHT	140g
SIZE	50mm(W) × 100mm(H) × 38mm(D) (Except for OFDM receiver)
BATTERY	2 Hours
CPU	SH-Mobile
MEMORY	64MB
LCD	QVGA
Broadcasting Specification	
SYSTEM	MPEG-2 TS
VIDEO	MPEG-4 Visual Simple Profile
AUDIO	MPEG-2 AAC LC
DATA	ARIB STD-B24+KDDI Profile

Actually MPEG-4 AVC/H.264 will be used for video codec system

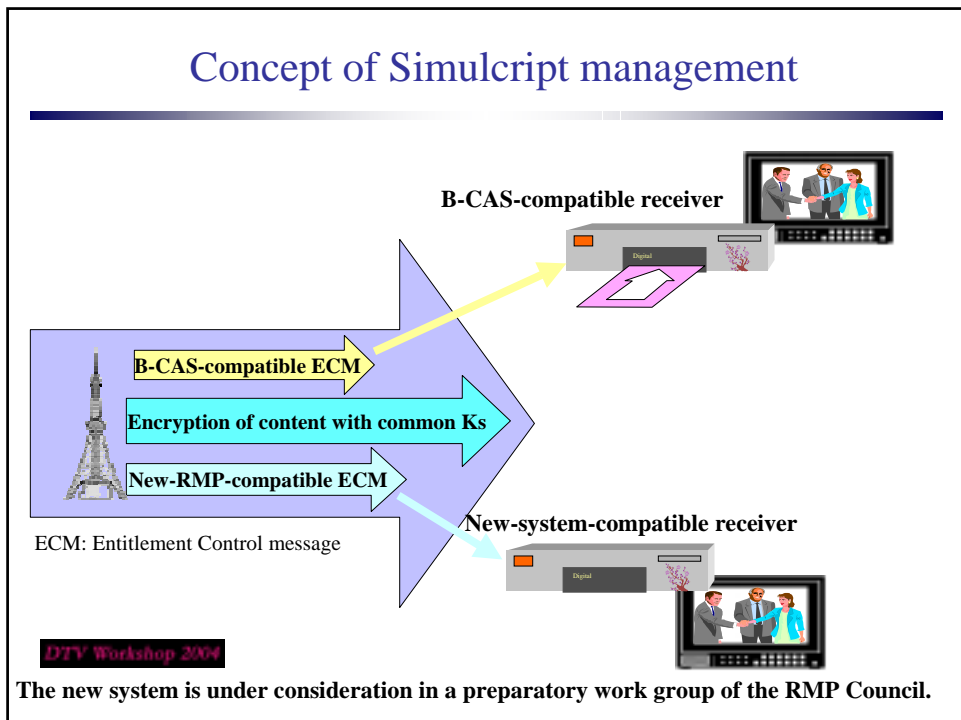
Implementation Schedule toward portable reception of DTTB

- **Video compression system: MPEG4 AVC/H.264**
- **Patent agreed in March 2004**
- **Prototype receivers developed by manufactures**
- **Service will start in 2005**
- **TV viewing on Cellular phone while commuting**

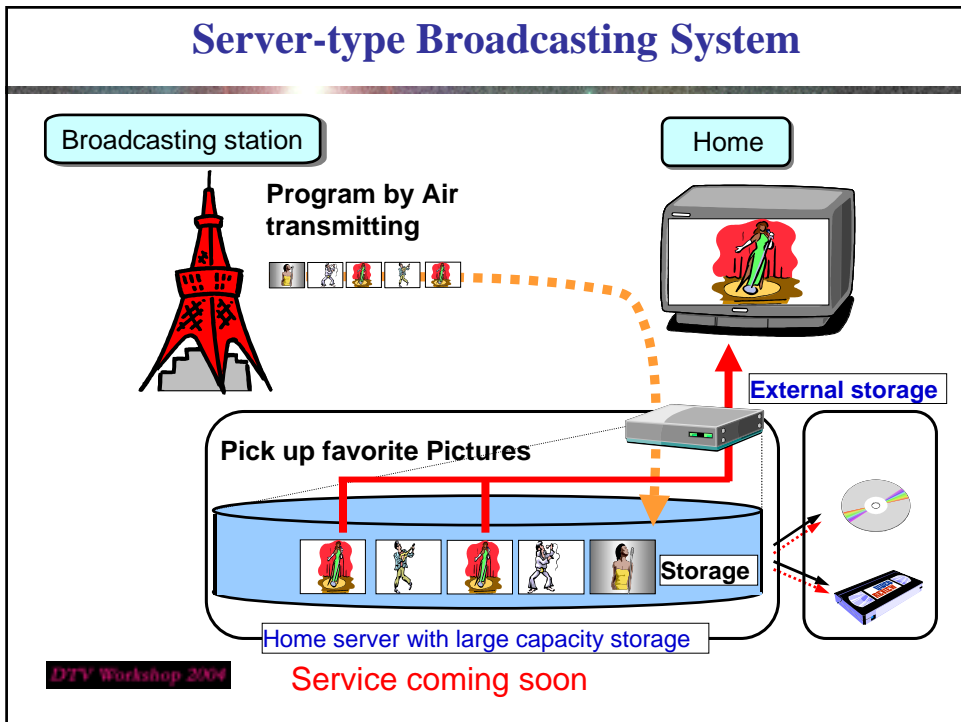
Outline of content protection receivers



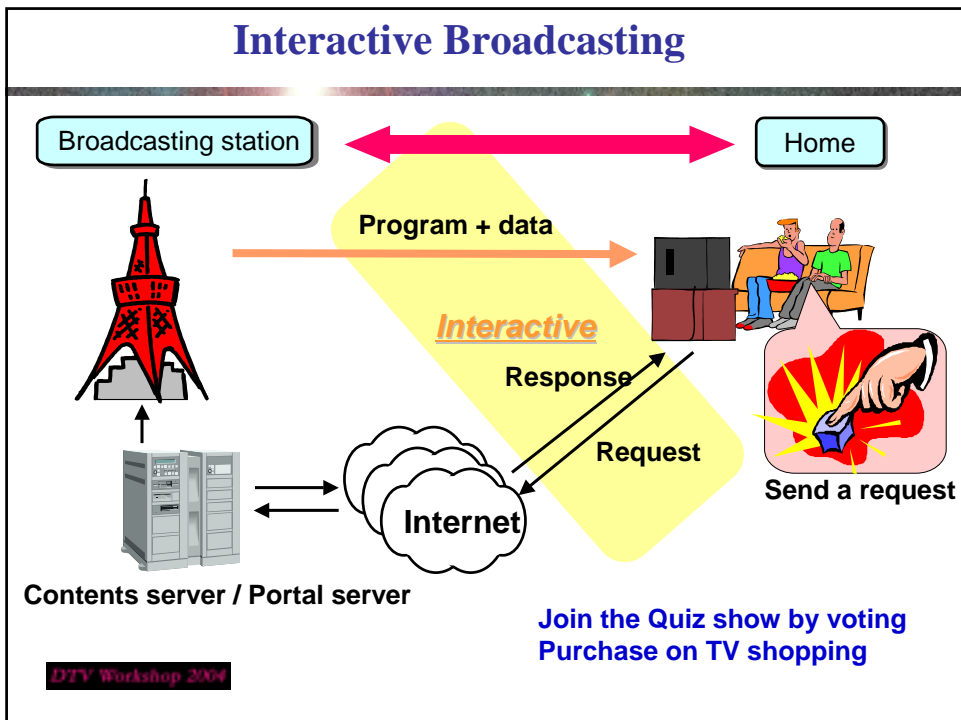
Concept of Simulcrypt management



Server-type Broadcasting System



Interactive Broadcasting



Current state of Digital Receiver in Japan & Forecast of Market

-Background; Digital terrestrial broadcasting has started Dec.2003. BS and 110 CS digital broadcasting has already started.

-Main current of digital receiver in Japan

(1) All in one type; Analog, 110 CS digital, BS digital and DTTB tuners are mounted)

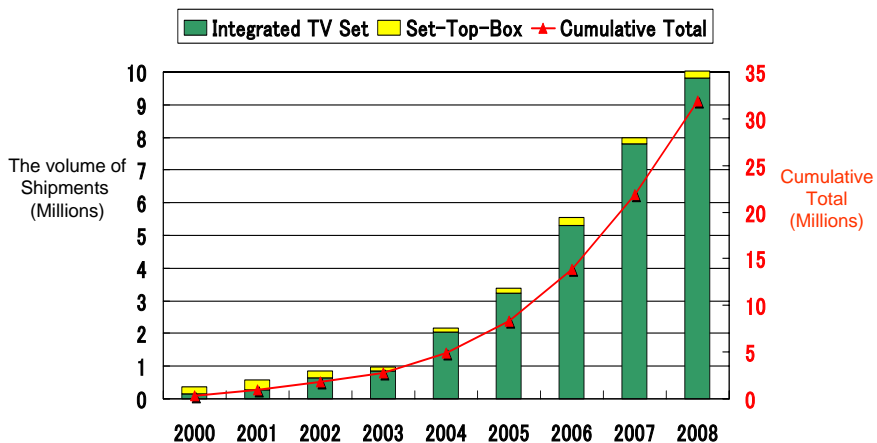
(2) Wide Screen; wider than 30" up to 50" screen type are popular to enjoy HDTV.

(3) Ratio of flat panel increased; in digital receiver market, flat panel get over than 50% this year

(4) Digital receiver market extremely grow ; JEITA forecasts the shipment of digital receiver (note) increase over than 50% of total TV set shipment within a couple of year

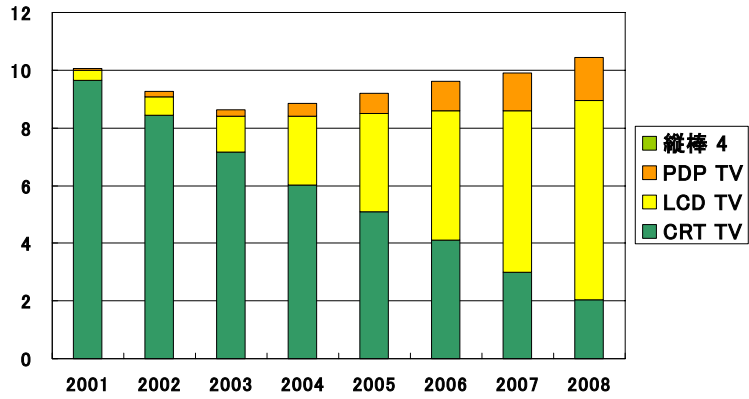
(note) analog receiving function is also equipped

Volume of Shipments of Digital TV Sets and Set-Top-boxes --Sales Achievements and Projections--



Source: JEITA Electronics and Statistics Committee AV Forecast Working Group

Ratios between Flat Panel Displays TV and CRT TV



Source: JEITA Electronics and Statistics Committee AV Forecast Working Group